WHAT IS CLAIMED IS:

1. A system for improving performance of wireless communications comprising:

a transmitter producing a modulated data signal combined with one or more supplemental signals on various frequencies within a monocarrier channel employed to transmit the modulated data signal; and

a receiver employing the one or more supplemental signals to compute a frequency domain channel estimate for use in equalizing the channel during demodulation of the data signal.

2. The system as set forth in Claim 1 wherein the one or more supplemental signals each employ a different frequency which changes during each of a plurality of periods, wherein the time-varying frequency for each supplemental signal changes from one period to a subsequent period in a predetermined sequence of frequencies within the channel.

3. The system as set forth in Claim 2 wherein the predetermined sequence spans frequencies within the channel to directly provide a frequency domain channel estimate.

4. The system as set forth in Claim 2 wherein the predetermined sequence is coordinated with a field sync within the modulated data signal.

5. The system as set forth in Claim 2 wherein the one or more supplemental signals are each transmitted with a power selected to minimize interference with demodulation of the data signal without reference to the one or more supplemental signals.

6. The system as set forth in Claim 2 wherein the time varying frequency cycles through all frequencies within the predetermined sequence at a rate sufficient to permit multiple channel estimates for a single field of the modulated data signal.

7. The system as set forth in Claim 2 wherein the predetermined sequence is coordinated with a field sync within the modulated data signal and wherein the one or more supplemental signals are each transmitted with a power selected to minimize interference with demodulation of the data signal without reference to the one or more supplemental signals.

8. A transmitter for improved wireless communications comprising:

a symbol source producing a data signal;

a waveform generator producing a time-varying signal which changes frequency during each of a plurality of periods, wherein the frequency changes from one period to a subsequent period in a predetermined sequence of frequencies within a channel to be employed in transmitting the data; and

a modulator producing a transmission signal from a combination of the data signal and the time-varying signal.

9. The transmitter as set forth in Claim 8 wherein the predetermined sequence spans the channel to directly provide a frequency domain channel estimate.

10. The transmitter as set forth in Claim 8 wherein the predetermined sequence is coordinated with a field sync within the data signal.

11. The transmitter as set forth in Claim 8 wherein the time-varying signal is transmitted with a power selected to minimize interference with demodulation of the data signal without reference to the time-varying signal.

12. The transmitter as set forth in Claim 8 wherein the time varying signal cycles through all frequencies within the predetermined sequence at a rate sufficient to permit multiple channel estimates for a single field of the data signal.

13. The transmitter as set forth in Claim 8 wherein the predetermined sequence is coordinated with a field sync within the data signal and wherein the time-varying signal is transmitted with a power selected to minimize interference with demodulation of the data signal without reference to the time-varying signal.

14. The transmitter as set forth in Claim 8 wherein the time-varying signal is one of a plurality of time-varying signals each having a different frequency during a period and each changing frequency from one period to a subsequent period in the predetermined sequence of frequencies.

15. A receiver for improved wireless communications comprising:

an equalizer performing channel equalization on a received signal utilizing a channel estimate; and

a coherent demodulator producing the channel estimate from the received signal and a time-varying signal corresponding to a portion of the received signal, wherein the time-varying signal changes frequency during each of a plurality of periods, wherein the frequency changes from one period to a subsequent period in a predetermined sequence of frequencies within a channel on which the received signal is received.

16. The receiver as set forth in Claim 15 further comprising:

a waveform generator producing the time varying-signal, wherein a period duration and the predetermined sequence match a corresponding period duration and predetermined sequence employed in generating the received signal.

17. The receiver as set forth in Claim 16 wherein the waveform generator produces a plurality of time-varying signals each having a different frequency during a period and each changing frequency from one period to a subsequent period in the predetermined sequence of frequencies, wherein the coherent demodulator produces the channel estimate from the received signal and each of the time-varying signals.

18. The receiver as set forth in Claim 15 wherein the predetermined sequence spans frequencies within the channel to directly provide a frequency domain channel estimate.

19. The receiver as set forth in Claim 15 wherein the predetermined sequence is coordinated with a field sync within the received signal.

20. The receiver as set forth in Claim 15 wherein the time varying frequency cycles through all frequencies within the predetermined sequence at a rate sufficient to permit multiple channel estimates for a single field of the received signal.

21. The receiver as set forth in Claim 15 further comprising:

a channel estimate post-processor smoothing the channel estimate, tracking time varying fades within the channel estimate, and producing Doppler estimates for the channel estimate.

22. A method of wireless communication comprising:

combining a data signal with one or more supplemental signals on various frequencies within a monocarrier channel; and

employing the one or more supplemental signals to compute a frequency domain channel estimate for use in equalizing the channel during demodulation of the data signal.

23. The method as set forth in Claim 22 wherein the step of combining a data signal with one or more supplemental signals on various frequencies within a monocarrier channel further comprises:

combining the data signal with one or more supplemental signals each employing a different frequency which changes during each of a plurality of periods, wherein the time-varying frequency for each of the supplemental signals changes from one period to a subsequent period in a predetermined sequence of frequencies within the channel.

24. The method as set forth in Claim 23 further comprising:

periodically changing a frequency for each supplemental signal in a predetermined sequence spanning frequencies within the channel to directly provide a frequency domain channel estimate.

25. The method as set forth in Claim 23 further comprising:

coordinating the predetermined sequence with a field sync within the data signal.

26. The method as set forth in Claim 23 further comprising:

sweeping each supplemental signal through all frequencies within the predetermined sequence at a rate sufficient to permit multiple channel estimates for a single field of the data signal.

27. The method as set forth in Claim 22 further comprising:

providing each of the supplemental signals with a power selected to minimize interference with demodulation of the data signal without reference to the one or more supplemental signals.

28. The method as set forth in Claim 22 further comprising:

periodically changing a frequency for each supplemental signal in a predetermined sequence of frequencies within the channel coordinated with a field sync within the data signal; and

providing each of the supplemental signals with a power selected to minimize interference with demodulation of the data signal without reference to the one or more supplemental signals.

29. A method for improved wireless communications comprising:

producing a data signal;

producing a time-varying signal which changes frequency during each of a plurality of periods, wherein the frequency changes from one period to a subsequent period in a predetermined sequence of frequencies within a channel to be employed in transmitting the data; and

producing a transmission signal from a combination of the data signal and the time-varying signal.

30. The method as set forth in Claim 29 wherein the predetermined sequence spans the channel to directly provide a frequency domain channel estimate.

31. The method as set forth in Claim 29 wherein the predetermined sequence is coordinated with a field sync within the data signal.

32. The method as set forth in Claim 29 wherein the time-varying signal is provided with a power selected to minimize interference with demodulation of the data signal without reference to the time-varying signal.

33. The method as set forth in Claim 29 wherein the time varying signal cycles through all frequencies *within* the predetermined sequence at a rate sufficient to permit multiple channel estimates for a single field of the data signal.

34. The method as set forth in Claim 29 wherein the predetermined sequence is coordinated with a field sync within the data signal and wherein the time-varying signal is transmitted with a power selected to minimize interference with demodulation of the data signal without reference to the time-varying signal.

35. The method as set forth in Claim 29 wherein the time-varying signal is one of a plurality of time-varying signals each having a different frequency during a period and each changing frequency from one period to a subsequent period in the predetermined sequence of frequencies.

36. A method for improved wireless communications comprising:

receiving a signal;

producing the channel estimate from the received signal and a time-varying signal corresponding to a portion of the received signal, wherein the time-varying signal changes frequency during each of a plurality of periods, wherein the frequency changes from one period to a subsequent period in a predetermined sequence of frequencies within a channel on which the received signal is received; and

performing channel equalization on the received signal utilizing the channel estimate.

37. The method as set forth in Claim 36 further comprising:

producing the time varying-signal with a period duration and the predetermined sequence matching a corresponding period duration and predetermined sequence employed in generating the received signal.

38. The method as set forth in Claim 37 further comprising:

producing a plurality of time-varying signals each having a different frequency during a period and each changing frequency from one period to a subsequent period in the predetermined sequence of frequencies, wherein the channel estimate is produced from the received signal and each of the time-varying signals.

39. The method as set forth in Claim 36 wherein the predetermined sequence spans frequencies within the channel to directly provide a frequency domain channel estimate.

40. The method as set forth in Claim 36 wherein the predetermined sequence is coordinated with a field sync within the received signal.

41. The method as set forth in Claim 36 wherein the time varying frequency cycles through all frequencies within the predetermined sequence at a rate sufficient to permit multiple channel estimates for a single field of the received signal.

42. The method as set forth in Claim 36 further comprising:

smoothing the channel estimate, tracking time varying fades within the channel estimate, and producing Doppler estimates for the channel estimate.

43. A wireless communication signal comprising:

a data signal; and

at least one supplemental signal combined with the data signal, the at least one supplemental signal having a frequency which changes during each of a plurality of periods in a predetermined sequence of frequencies for a channel in which the wireless communication signal is transmitted.

44. The wireless communications signal as set forth in Claim 43 wherein the predetermined sequence of frequencies spans the channel.

45. The wireless communications signal as set forth in Claim 43 wherein the predetermined sequence is coordinated with a field sync within the data signal.

46. The wireless communications signal as set forth in Claim 43 wherein at least one supplemental signal sweeps the predetermined sequence at a rate sufficient to permit multiple channel estimates based on the at least one supplemental signal within a single filed of the data signal.

47. The wireless communications signal as set forth in Claim 43 wherein at least one supplemental signal has a power sufficiently less than a power for the data signal to permit demodulation of the data signal without reference to the at least one supplemental signal.

48. The wireless communications signal as set forth in Claim 43 wherein at least one supplemental signal further comprises:

a plurality of supplemental signals each having a different frequency during a given period and each changing frequencies in the predetermined sequence from one period to a subsequent period.

49. The wireless communications signal as set forth in Claim 43 wherein wireless communications signal is a result of modulating the combination of the data signal and the at least one supplemental signal.